

ENGINEERING INVENTIONS.

Mr. Charles W. Rasmusen, of Chicago, Ill., has patented an improvement in the class of street railways in which the cars are propelled by means of endless traveling wire ropes or cables arranged in a tube or tubular center rail (laid between the ordinary track or running rails) and passing around rotating drums located at the respective ends of the road, or at points which are at less distance apart. The improvements pertain to the combination of tubular center rail, the trucks that carry the traction cables, and the device attached to the car and adapted to lock with the trucks to cause propulsion of the car.

Mr. Edwin T. Pettit, of Marshalltown, Iowa, has patented an improved air pump for forcing and compressing air, the object being to furnish a machine by which a continuous stream of air can be forced through a pipe or into a receiver. It consists of two sets of single-acting cylinders, a series of direct-acting piston rods, with plungers at each end, and a series of driving cranks fitted to reciprocate the pistons. The pump has no inlet valve, each plunger being withdrawn from its cylinder to admit the air.

An improved car coupling has been patented by Mr. James W. Hancock, of Union, Ky. This invention relates to what are called "self-couplers," and it consists of drawheads with flaring and projecting sides and lower lips provided with vertical swinging pendants and transverse coupling pins and of a coupling link, consisting of a flat bar of metal bent downward in the center and having its ends curved or turned downward, to clasp or engage on the coupling pins.

An improved wicket and caisson for movable dams has been patented by Mr. William H. Dechant, of Reading, Pa. The object of the invention is to facilitate the work of construction and repair in connection with such dams; and the invention consists in the wickets for the dams and their connections to the bed, and in a movable caisson by which convenient access can be had to the wickets. The wickets may be used in rivers, canals, and other water-ways for deepening channels and for improvement of slack-water navigation.

An improvement in stamp mills has been patented by Mr. James M. McFarland, of Virginia City, Nev. The object of this invention is to provide a device by which stamps may be run with greater speed, greater crushing force, and less liability to injury or wear of working parts. The invention consists of a separate cam shaft with single-armed cam or cams for forcing the stamps down, and of elastic or spring cams for obviating the usual shock or jar that obtains when an inelastic cam comes in contact with a stamp tappet.

An improvement in car couplings has been patented by Mr. William L. Fisher, of South Saginaw, Mich. The object of this invention is to provide an improved car coupling device which is adapted to use the ordinary forms of coupling pin and link within a chambered drawhead, and to provide means whereby the coupling pin is upheld, and is released automatically to couple the cars on the entrance of the coupling link, which is held in a horizontal position and is always protected from injury.

An improved railway rail has been patented by Mr. Henry A. Fletcher, of Lowca Engine Works, near Whitehaven, County of Cumberland, England. This improvement relates to rails used for the permanent way of railways and tramways, and is designed to obtain more solid and firm support to the rails without materially increasing the material. The invention consists in an improved form of base or lower flange for the rail, it being extended or spread out where it rests upon the sleeper or other support, instead of being made, as usual, of a parallel form throughout.

Mr. Theodore F. Odell, of Nyack, N. Y., has patented a device for propelling vessels which will utilize the power much more economically than the devices in use for the same purpose heretofore. The invention consists of a series of paddles attached to the lower edges of frames loosely mounted on the edges of eccentric wheels mounted on a shaft and projecting in opposite directions, which frames have an upper arm connected with a rigid frame by a pivoted rod, so that if the shaft is rotated the paddles will describe a segmental curve in the water, will be raised and describe a segmental curve in the air in opposite direction, and will dip in the water and describe the same segmental curve in the water, and so on, thereby propelling the vessel.

The Acetate of Soda Stove.

Two methods of utilizing acetate of soda for warming purposes are before the public: the original invention of M. Ancelin, in which acetate of soda alone is used, and a modification recently patented by Herr A. Nieske, a chemist of Dresden. The *English Mechanic* says that the former has been taken up by the London and Northwestern Railway Company, who have a license for three thousand foot warmers, but according to the statements made, the invention of Herr Nieske is in some respects superior. It appears that two of the soda salts are peculiarly adapted to the purpose, namely, the hyposulphite and the acetate. The first-named salt has the property of melting easier than the latter, consequently, when the hyposulphite of soda is mixed with acetate of soda, the former prevents the latter from crystallizing too rapidly. The two salts combine and form a permanent filling, so that the reservoirs, vessels, or receptacles containing the same can be soldered down, and thus hermetically closed. Herr Nieske has found it preferable to employ the following proportion of the salts: one part hypo-

sulphite of soda to ten parts acetate of soda. The reservoirs or receptacles are filled to about three parts full, and the lid soldered on. In order to prepare the reservoirs for employment they are placed in boiling water until the filling is melted; this is readily ascertained by shaking the reservoir or vessel, which can be modified in form according to the purpose for which it is used.

Fig. 1 is a vertical section, and Fig. 2 a horizontal section of a "stove" which is suited for employment in bedrooms, sick rooms, offices, dwelling and other rooms. The stove is placed on three or more feet with casters, so as to enable

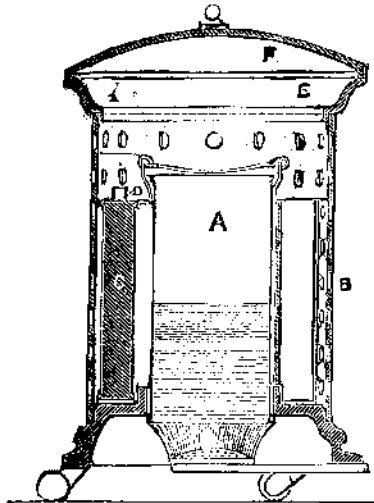


Fig. 1.

it to be easily transported from one place to another. A is a vessel of cylindrical or other suitable form; B is a perforated mantle forming the outer walls of the stove. The reservoirs, C, filled with the soda salts above named, are arranged between the vessel, A, and the perforated mantle, B, of the stove. They are of such size that they can be inserted in the central vessel, A, by means of their handles, D. The stove is closed by the cap, E, and lid, F, which can be readily removed. The water in the vessel, A, can be brought to a boiling point by means of a burner in connection with a gas pipe.

As soon as the water in the vessel, A, has been brought up to the boiling point, the reservoirs, C, which contain the soda salts, are inserted in A, until the salts contained in them are melted. The reservoirs are then replaced in their former position between cylinder and mantle, and emit the heat they contain so gradually and equally that the filling even after a lapse of from ten to twelve hours is found to be warm. The cylinder or vessel, A, can be entirely removed from the stove, and the reservoirs heated, or the soda salts contained in the same melted in any suitable boiler or similar receptacle; or the vessel, C, can be heated in any other suitable place. The cylindrical vessel, A, is for this purpose provided with a projecting ring or flange, which lies on three supports or brackets, which also serve to support the reservoir, C. The evaporation of the water in the vessel, A, prevents the air in the room becoming too dry. For

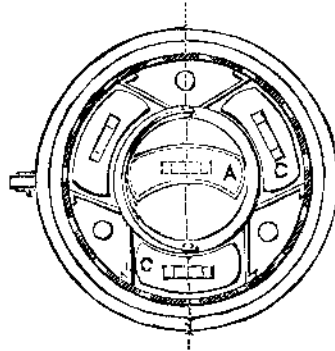


Fig. 2.

foot-warmers, tubing or pipes run through the filling so as to attain a greater surface for the emission of warmth; such foot-warmers retain their warming properties for about twelve hours. Stomach, chest, and other warmers can be employed with the same filling, and are adapted for employment in hospitals, sick rooms, and such like. The warmth emitted by these reservoirs is especially beneficial to patients, as the heat remains equable, continues for several hours, and is not only agreeable but beneficial. Another application to which this class of warmth reservoir can be put is to place the same within a nickered or other suitable ball, which can be easily carried in a muff, overcoat, etc., and can be held in the hand when skating, riding, driving, walking, and so on, in cold weather. They can also be most advantageously employed for artificial breeding apparatus or incubators, as the warmth remains continuously the same, and is therefore the best substitute for the natural warmth of the blood.

The Weakness of the Large Groined Vault in the Assembly Chamber of the New Capitol at Albany.

When the crack first appeared in the large vault of the Assembly Chamber at Albany, the trouble was supposed to arise from the yielding of the clayey earth upon which the Capitol stands. Combating the theory that there was danger of a sliding of the entire building down the hill upon which it stands, Mr. Wm. J. McAlpine, the engineer in charge of the earlier foundation work, expressed the opinion

that the crack was due to an unequal settlement of the walls. He said: "The four walls of the Assembly Chamber respectively were intended to carry loads of 60, 47, 23, 18 tons, and the foundation walls were built out accordingly. This arrangement was on the idea that these walls would carry the ceiling of the room. When it was determined by the later architect to have a stone ceiling, and to support it upon columns independent of the outer walls, everything was altered. The foundations of these columns must hit upon the outer edge of the footing course of the wall, and they do the damage." Another theory was that the arch had been warped by unequal loading.

The subject has more recently been investigated by Mr. H. W. Fabian, who enters into an elaborate calculation, in the *American Architect*, to demonstrate an inherent weakness in the whole vault due to faulty construction. He finds that to enable the columns to withstand the great thrust of the arches and ribs of the central vault a method of construction has been employed which must in time lead to downfall of the entire structure. Immediately over the principal arches of the square corner vaults great half arches, not visible, have been raised, whose skew-backs continually press against the columns. The half arches are held together at the top by iron tie rods, which run through the wall above the great principal arches, connecting one half arch with another; a dangerous device owing to the unequal expansion and contraction of the iron and stone by variations in temperature, a perpetual cause of disintegration. The work of destruction Mr. Fabian finds to be hastened by radical faults in the moulding of the ribs of the vault, so that sooner or later a wider destruction of the ribs, and consequently of the whole vault, will take place. Absolute security against such a disaster can be obtained, he asserts, only by tearing down the whole vault and building another in its place.

Correspondence.

Intelligence of Dogs.

To the Editor of the *Scientific American*:

In the *SCIENTIFIC AMERICAN* of December 17, I notice a dog story, which prompts me to relate another, showing the wonderful sagacity of that animal.

While at the university taking my medical course the facts I relate took place. Among other appurtenances to the department of physiological chemistry was a dog with a gastric fistula, which fistula was properly healed around a silver tube having an internal and external flange to keep it in place. The tube was stopped by a closely fitted cork, except at such times as we needed a supply of gastric juice. The fistula caused the animal no disturbance whatever. He was well and hearty, was fed at and made his home at the medical department.

During the summer vacation, however, when the university was closed, he was transferred to the care of the surgeon, who took him to his house. During his frolics one day he jumped over a fence, striking it, and dislodged the cork in the tube. Ponto soon noticed that his food didn't seem to satisfy him, and that all he drank ran out of his stomach on the ground. His master having gone away for several days—fishing—he must needs take care of himself, so immediately on eating or drinking anything, he ran to his bed in the carriage house close by, turned on his back, and remained so for an hour or more, or until he felt satisfied that it would do for him to get up. Coaxing, threatening, and kicking by the domestics about the house, or by those whose attention was called to his actions, were alike unavailing to drive him from his place or from his supine position. Finally, some one who knew for what purposes the dog was used, examined his fistula and found the cork gone. This being restored, he was soon persuaded to go about as usual, and indicated by his actions that he understood that everything was all right. This incident can be vouched for by many reliable persons. Who will say that dogs—at least one dog—cannot reason? F. L. BARDEEN, M.D.

Rochester, N. Y., December 23, 1881.

Mr. Lawson's Boiler Experiment.

To the Editor of the *Scientific American*:

Reading your article on the boiler experiments of D. T. Lawson, Wellsville, O., I was reminded of the following old one: Boil water in a closed glass vessel. When the steam formed inside gets above the pressure of some atmospheres it will arrest the boiling. Then pour some cold water on the outside. The steam is partly condensed, the pressure removed, and ebullition recommences. This paradoxical experiment has always been explained on Mr. Lawson's doctrine that removing pressure causes the heated water to burst suddenly into steam. I imagine the glass globe arrangement might be advantageously used to confirm or refute his further opinion that the effect of the concussion is greater than the regular steam pressure.

Eau Claire, Wis., 1882.

C. L. JAMES.

California Trout Eggs for Distribution.

The New York State Fish Commission will send any parties wishing to experiment in fish culture from 300 to 500 eggs of the California mountain trout, on receipt of fifty cents to pay for the package. This species is very hardy, and a valuable game and food fish. Applications must be made before March 1, 1882, to Seth Green, Rochester, N. Y.